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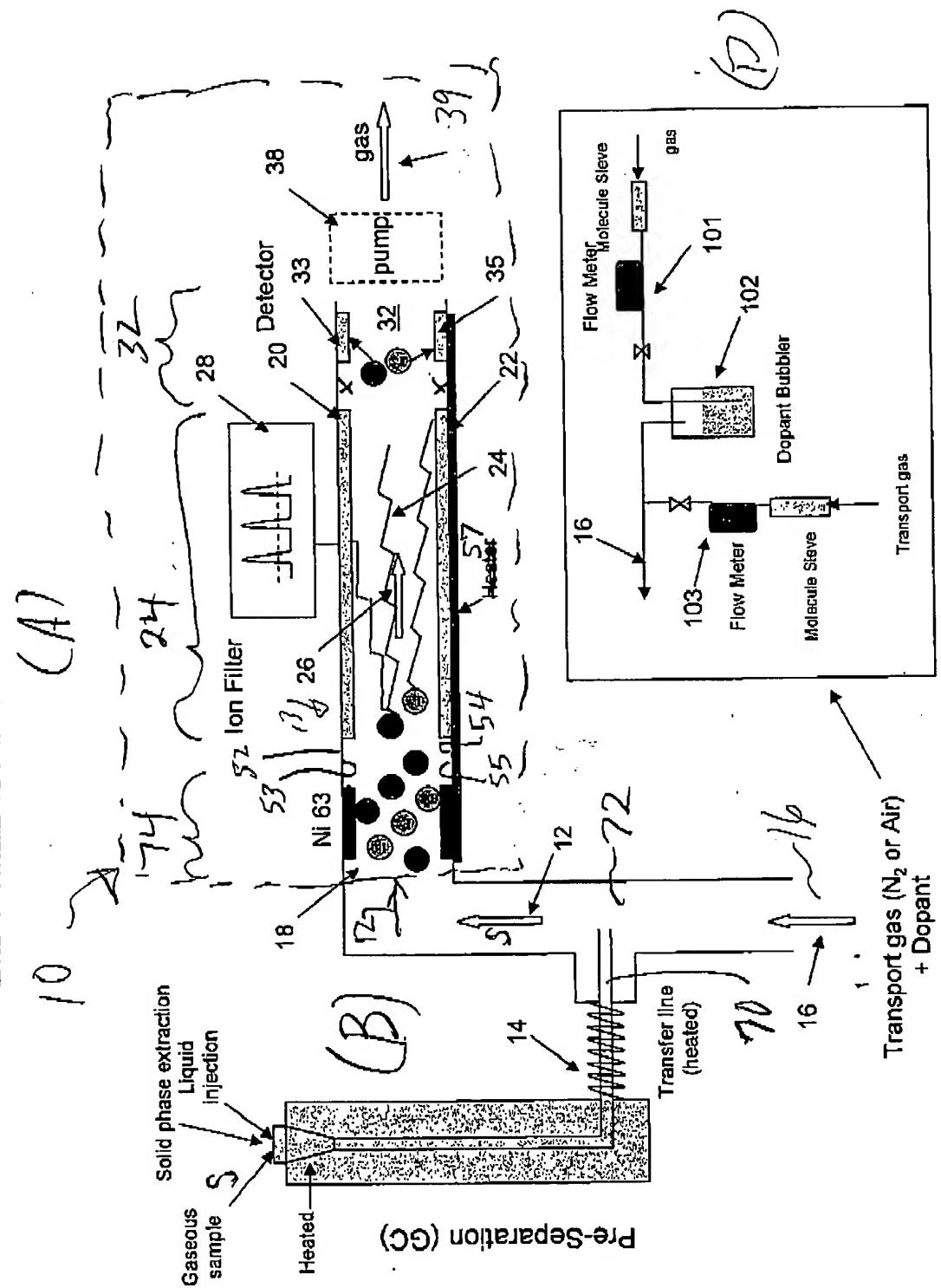


FIG.

FIG. 1  
(C)

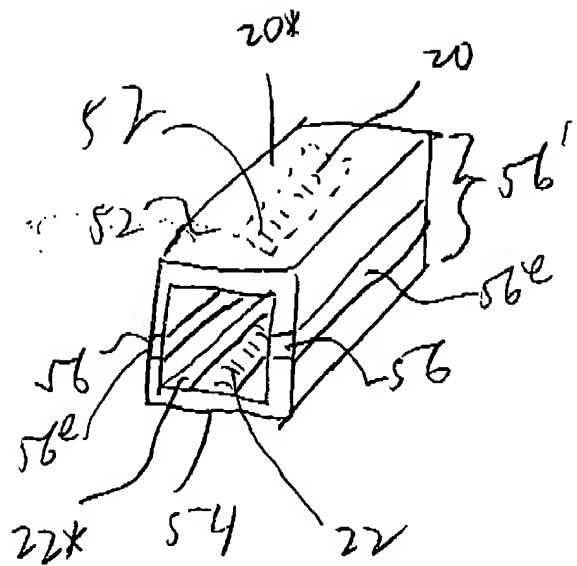
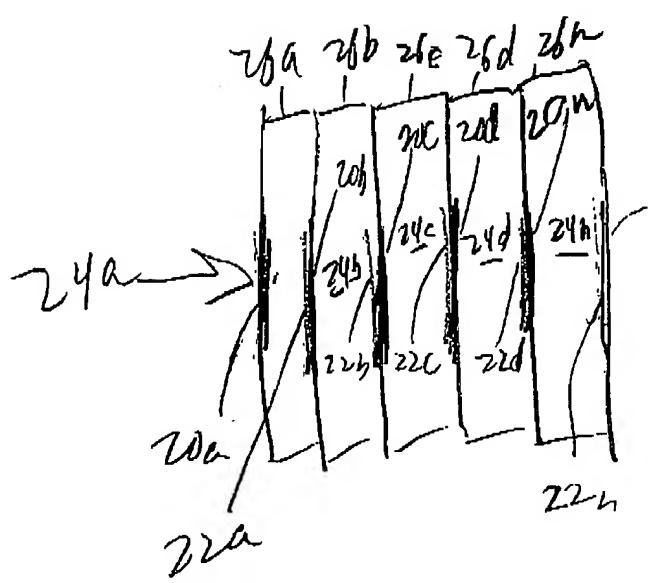


FIG. 1  
(E)



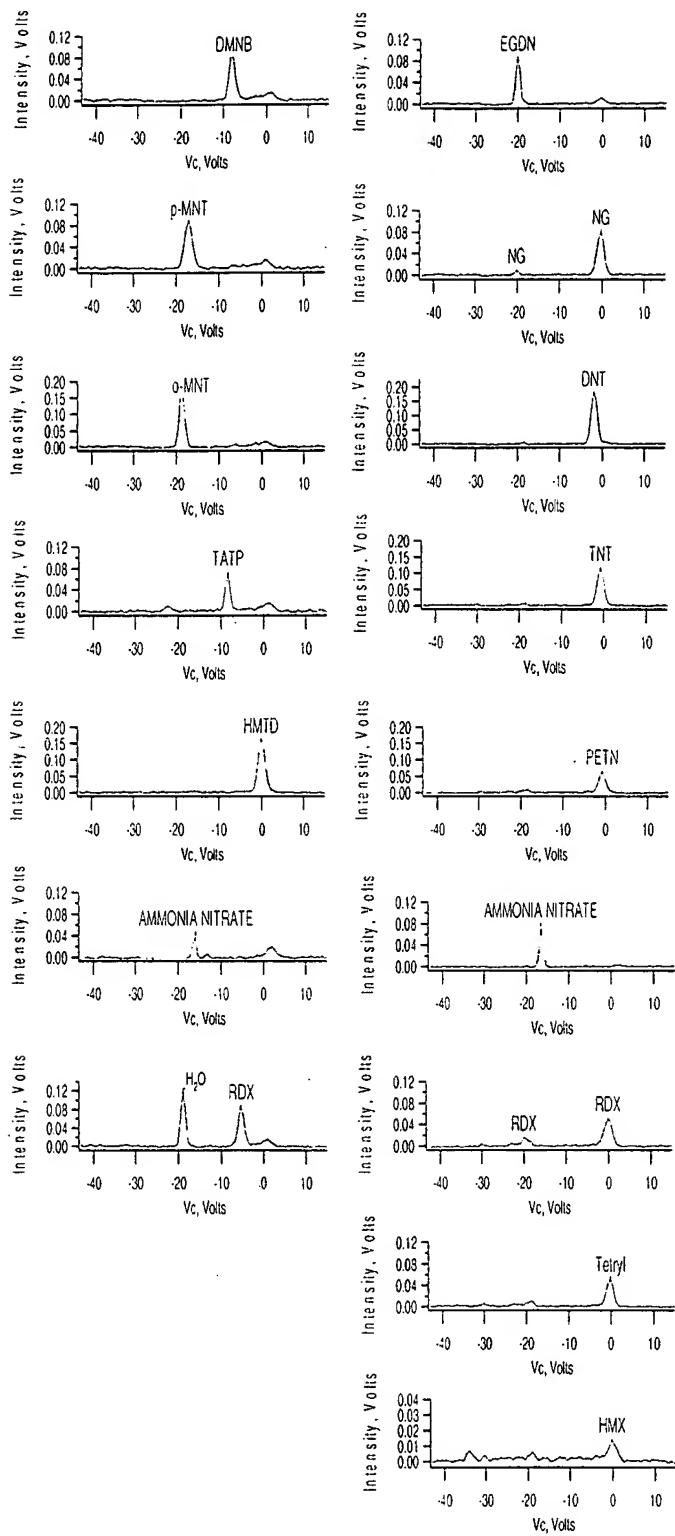


FIG. 2

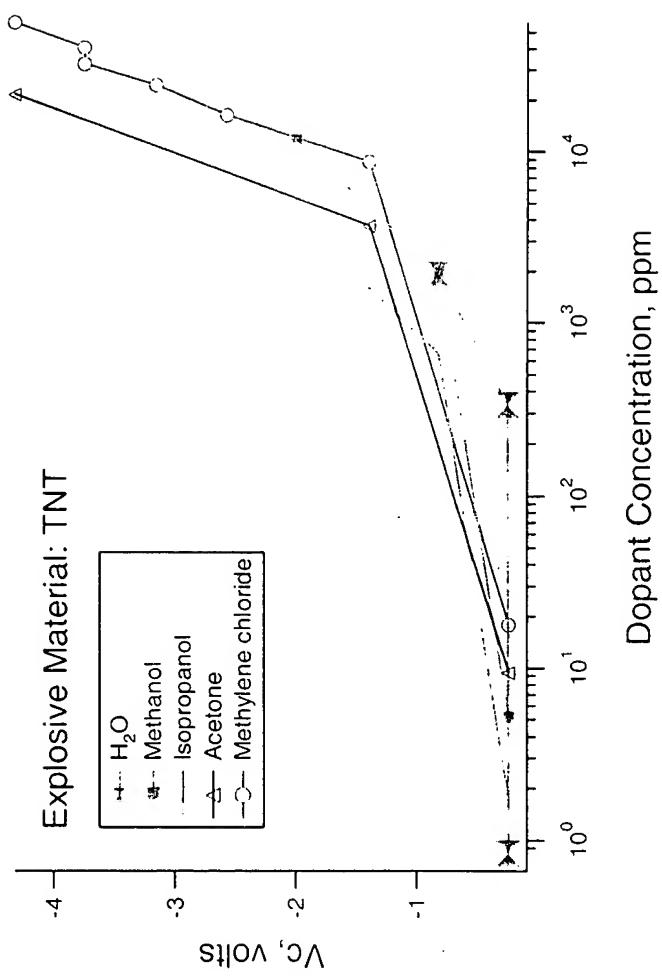


FIG. 3

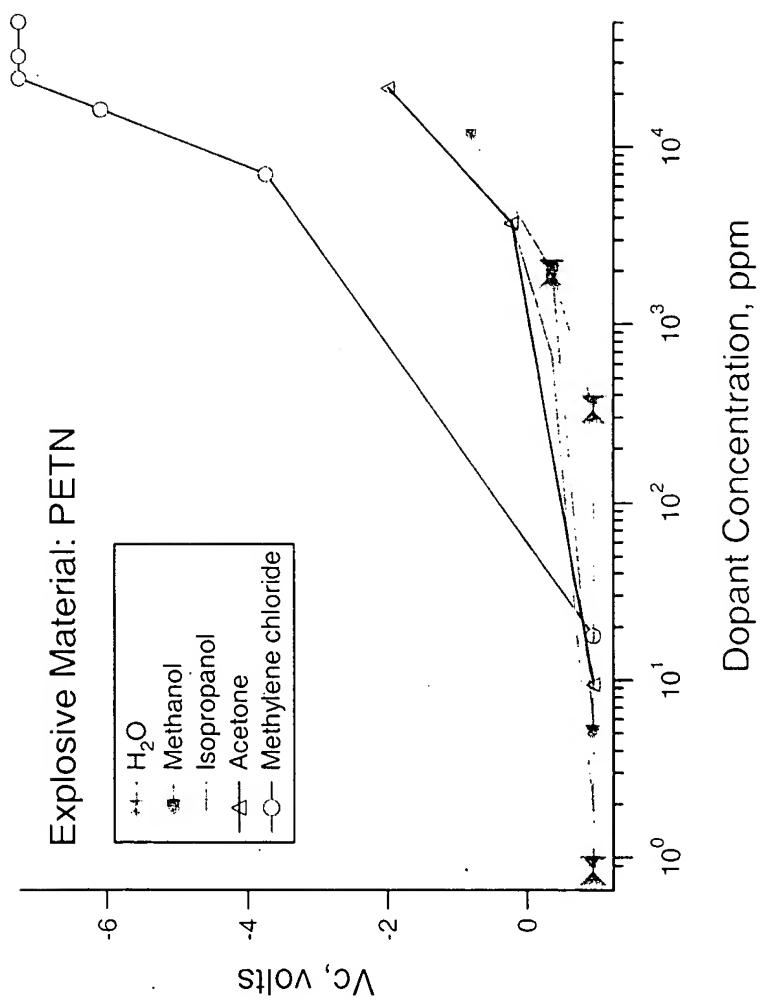


FIG. 4A

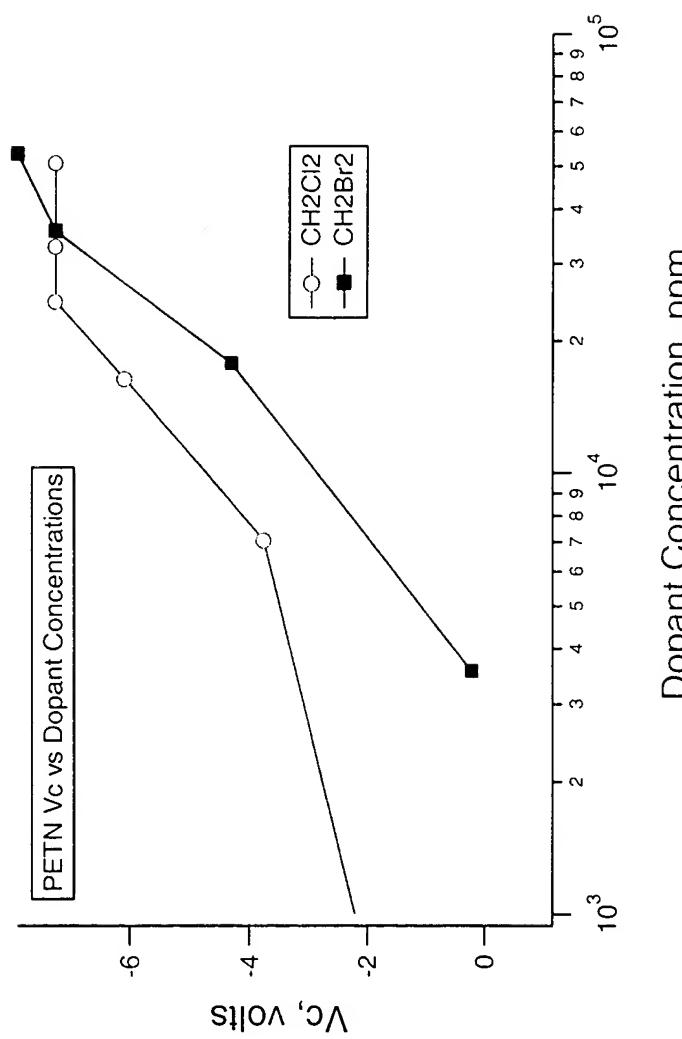


FIG. 4B

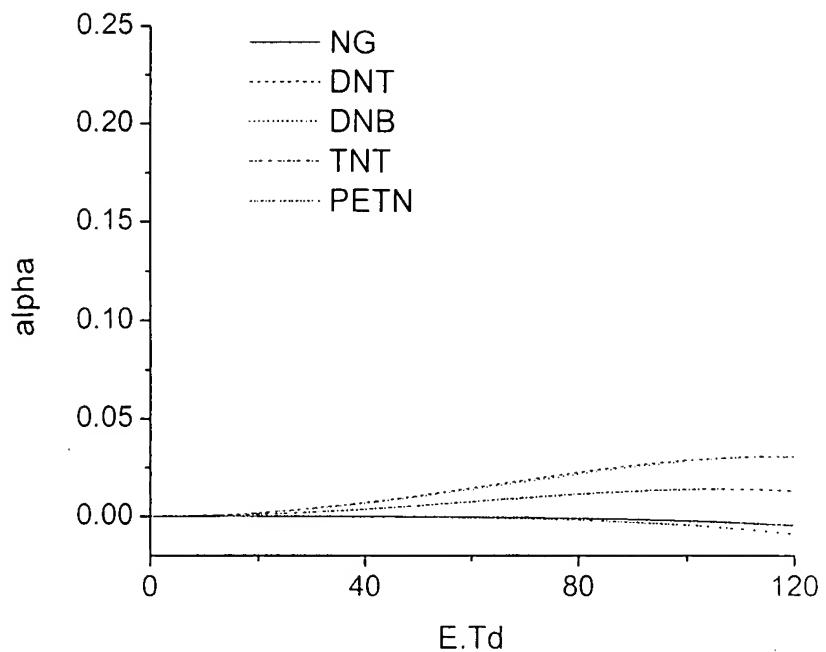


FIG. 5A

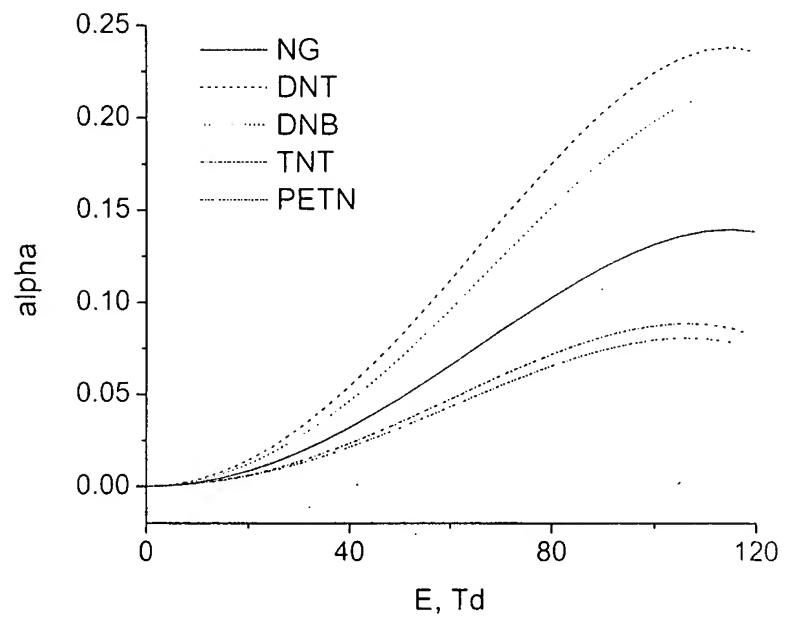


FIG. 5B

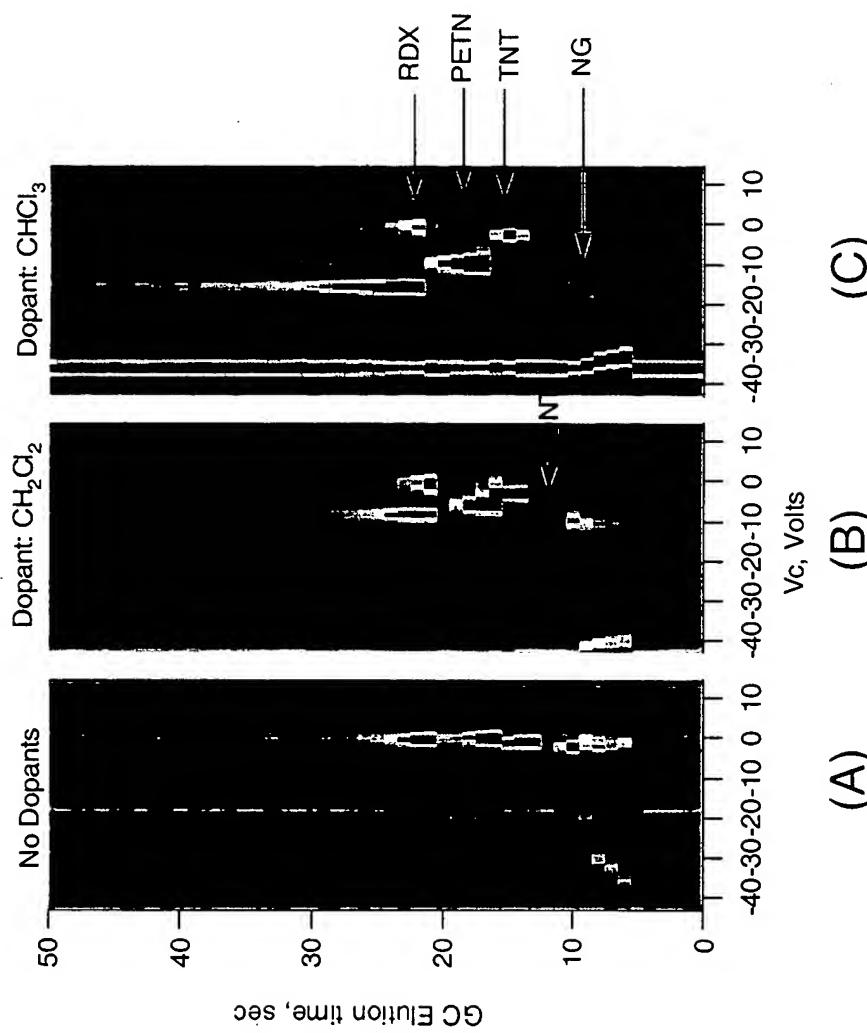


FIG. 6

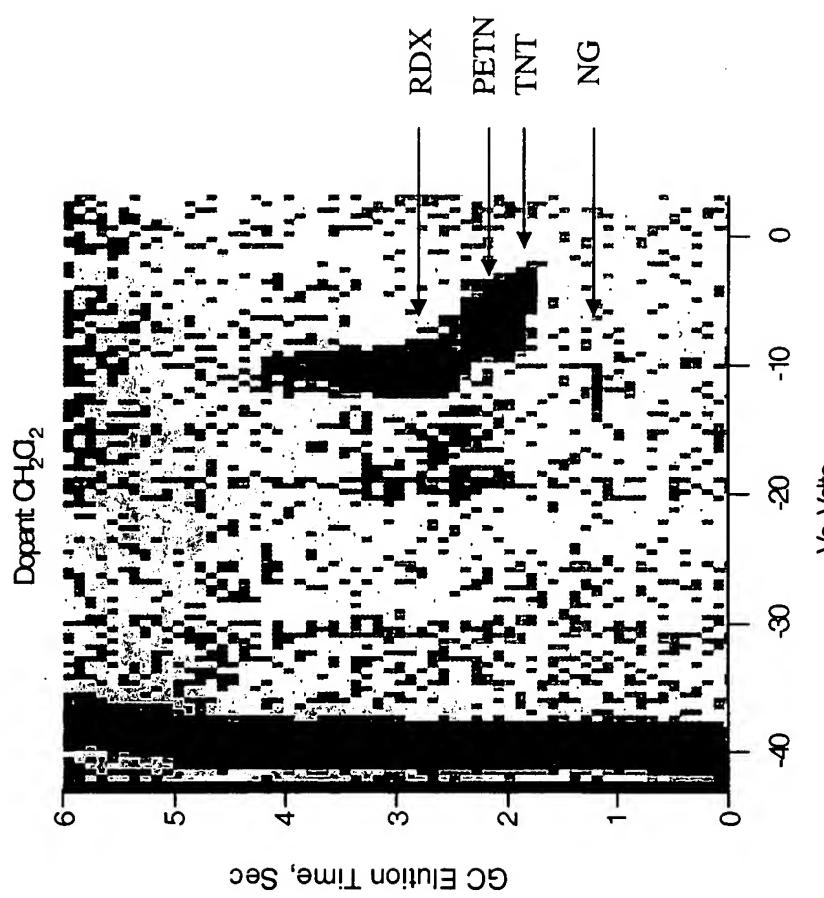


FIG. 7

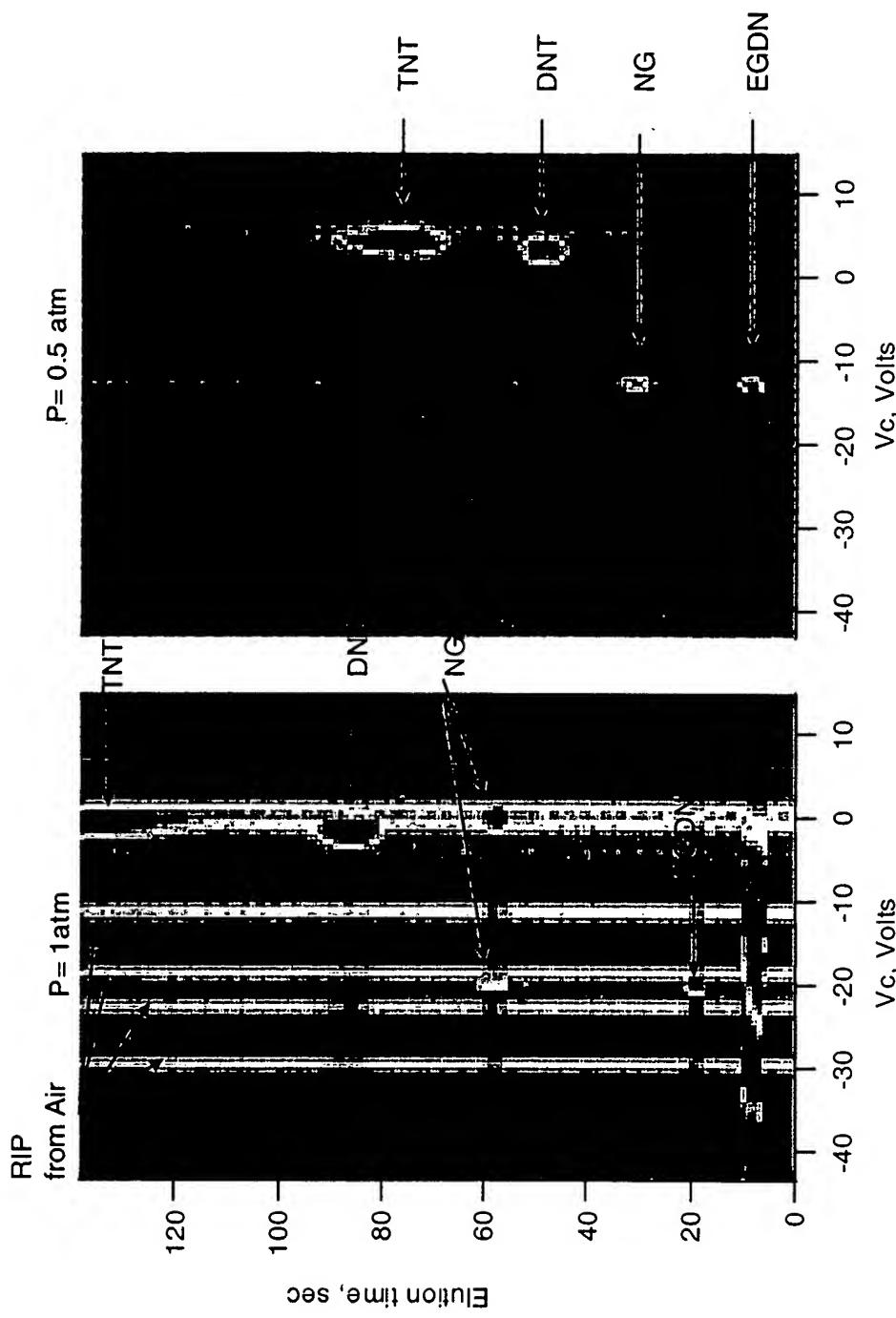


FIG. 8

(a) (b)

Explosive/ Taggant	No Dopant	CH <sub>2</sub> Br <sub>2</sub> , 2%	CH <sub>2</sub> Cl <sub>2</sub> , 2.5%	CH <sub>3</sub> OH, 1%	Isopropanol, 2%
HMX t=95 sec	✓, Negative Vc=-0.23 Rf 950V, Air, 120 C, 1atm long drag, inlet T 150- >190C, Oven T 50->100C, 80C/m->100C/m	✓, Negative Vc=-4.9 Rf 950V, Air, 120 C, 1atm long drag, inlet T 150- >190C, Oven T 50->100C, 80C/m->100C/m	✓, Negative Vc=-6.1 Rf 950V, Air, 120 C, 1atm long drag, inlet T 150- >190C, Oven T 50->100C, 80C/m->100C/m	✓, Negative GC temperature was low, HMX did not move.	Not measured
Tetryl t=116 sec t=160 sec	✓, Negative Vc=-0.23 Rf 950V, Air, 120 C, 1atm Inlet T 150, Oven T 50, 80C/min split 5:1, f=8 cc/min unless specifically noted, other molecules are under same GC conditions	Not measured	✓, Negative Two peaks Vc=-1.99, -6.68, Rf 950V, Air, 120 C, 1atm	✓, Negative Vc=-0.82 Rf 950V, Air, 120 C, 1atm	Not measured
PETN t=104 sec	✓, Negative Vc=-0.23 Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative Vc=-7.9 Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml long drag	✓, Negative Vc=-5.51 Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative Vc=-1.5 Rf 950V, Air, 120 C, 1atm, mix6x10 GC column flow was low	✓, Negative Vc=-5.51 Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml

FIG. 9 (Part 1)

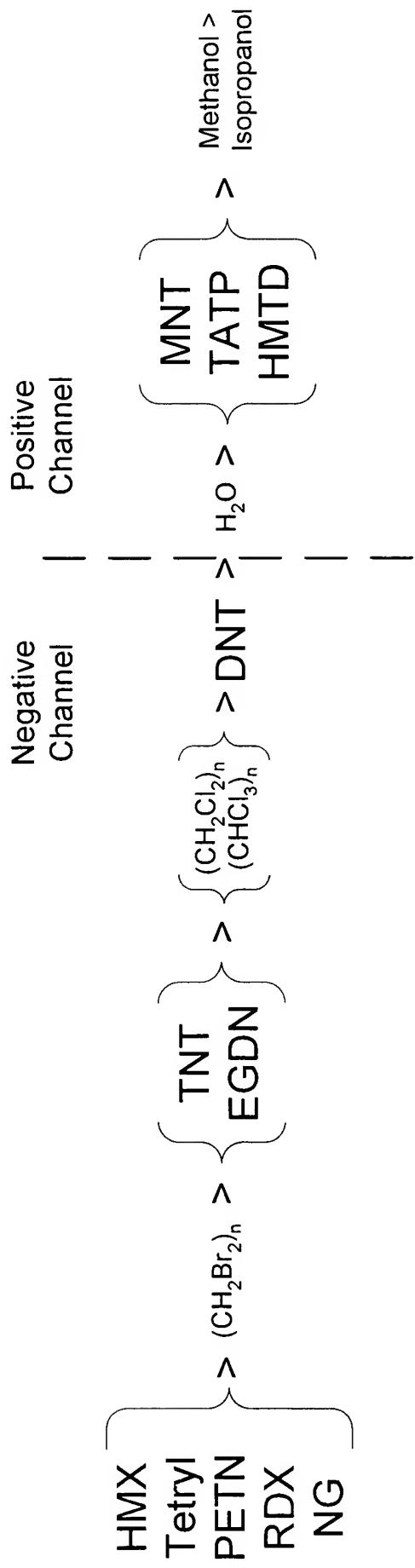
Explosive/ Taggant	No Dopant	CH <sub>2</sub> Br <sub>2</sub> , 2%	CH <sub>2</sub> Cl <sub>2</sub> , 2.5%	CH <sub>3</sub> OH, 1%	Isopropanol, 2%
	✓, Negative ✓, Positive	✓, Negative ✓, Positive	✓, Negative ✓, Positive	✓, Negative ✓, Positive	✓, Negative ✓, Negative
RDX t=37 sec(+) t=72 sec(-)	Vc=-0.3, --negative Vc=-4.92, --positive Rf 950V, Air, 120 C, 1atm, mix6x10 Pos and neg are at different retention time, break down effect	Vc=-9, Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml	Vc=-8.43, --negative Vc=-6.68, --positive Rf 950V, Air, 120 C, 1atm, mix6x10 Pos and neg are at different retention time, break down effect	Vc=-2.58, Rf 950V, Air, 120 C, 1atm, mix6x10 no Pos ion shown, MeOH depressed it.	Vc=-6.68, Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml
NG t=31 sec	Two Peaks Vc=-0.23, -20.7, Rf 950V, Air, 120 C, 1atm, mix6x10	Vc=-10, Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml	Vc=-9.6, Rf 950V, Air, 120 C, 1atm, mix6x10	Two peaks Vc=-2.58, -33.7, Rf 950V, Air, 120 C, 1atm, mix6x10	Vc=-10, Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml
TNT t=72 sec	✓, Negative Vc=-0.82, Rf 950V, Air, 120 C, 1atm, mix6x10	X	✓, Negative Vc=-2.58, Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative Vc=-0.82, Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative Vc=-10, Rf 1050V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml
EGDN t=10 sec	Vc=-20, Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative X ?	✓, Negative Vc=-34, Rf 950V, Air, 120 C, 1atm, 2 uL, 0.1 mg/ml peak too close to MeCl <sub>2</sub> (- 36 V)	✓, Negative Vc=-33.7, Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative Vc=-30, Rf 850V, N2, 120 C, 1atm, 1 uL, 0.1 mg/ml peak too close to Isopropanol (-32 V)
DNT t=48 sec	Vc=-1.7 Rf 950V, Air, 120 C, 1atm, mix6x10	✓, Negative no peaks	X	✓, Negative no peaks	✓, Negative Vc=-16.7 Rf 950V, Air, 120 C, 1atm, mix6x10 1atm, weak signal decreased by 20 times

FIG. 9 (Part 2)

Explosive/ Taggant	No Dopant	CH <sub>2</sub> Br <sub>2</sub> , 2%	CH <sub>2</sub> Cl <sub>2</sub> , 2.5%	CH <sub>3</sub> OH, 1%	Isopropanol, 2%
	✓, Positive	Not measured	✓, Positive	✗	Not measured
o-MNT Taggant t=16 sec	Vc=-17.8, Rf 950V, Air, 120 C, 1atm, too close to RIP		Vc=-14.3, Rf 950V, Air, 120 C, 1atm, too close to RIP		
p-MNT Taggant sec	✓, Positive	Not measured	✓, Positive	✗	Not measured
	Vc=-16.7, Rf 950V, Air, 120 C, 1atm, too close to RIP		Vc=-14.9, Rf 950V, Air, 120 C, 1atm, too close to RIP		
	✓, Positive	Not measured	✓, Positive	✗	Not measured
DMNB t=17 sec	Vc=-7.9, Rf 950V, Air, 120 C, 1atm		Vc=-9, Rf 950V, Air, 120 C, 1atm		
	✓, Positive	Not measured	✓, Positive	✓, Positive	✗
TATP t=13 sec	Vc=-8.43, Rf 950V, Air, 120 C, 1atm		Vc=-10.8, Rf 950V, Air, 120 C, 1atm	Vc=-5, Rf 950V, Air, 120 C, 1atm	
	✓, Positive	Not measured	✓, Positive	✓, Positive	✗
HMTD t=49 sec	Vc=1.5, Rf 950V, Air, 120 C, 0.6atm old sample		Vc=-1.4, Rf 950V, Air, 120 C, 1atm new sample	Vc=-0.82, Rf 950V, Air, 120 C, 1atm old sample	
	✓, Negative	Not measured	✓, Negative	Not measured	✓, Negative
	✓, Positive		✓, Positive		
AN t(+) = 3 sec t(-) = 6 sec	Vc=-19.6,-negative Vc=-19.6,-positive Rf 950V, air, 120 C, 1atm Pos and neg are at different retention time, break down to NH3 (+) and HNO3(-)		Vc=-41.83, -negative Vc=-24.3, -positive Rf 950V, air, 120 C, 1atm Pos and neg are at different retention time, break down to NH3 (+) and HNO3(-)	Vc=-3.75, Rf 950V, Air, 120 C, 1atm, mix6x10 no Pos ion shown, Isopropanol depressed it.	

FIG. 9 (Part 3)

## Electron Affinity



## Proton Affinity



FIG. 10

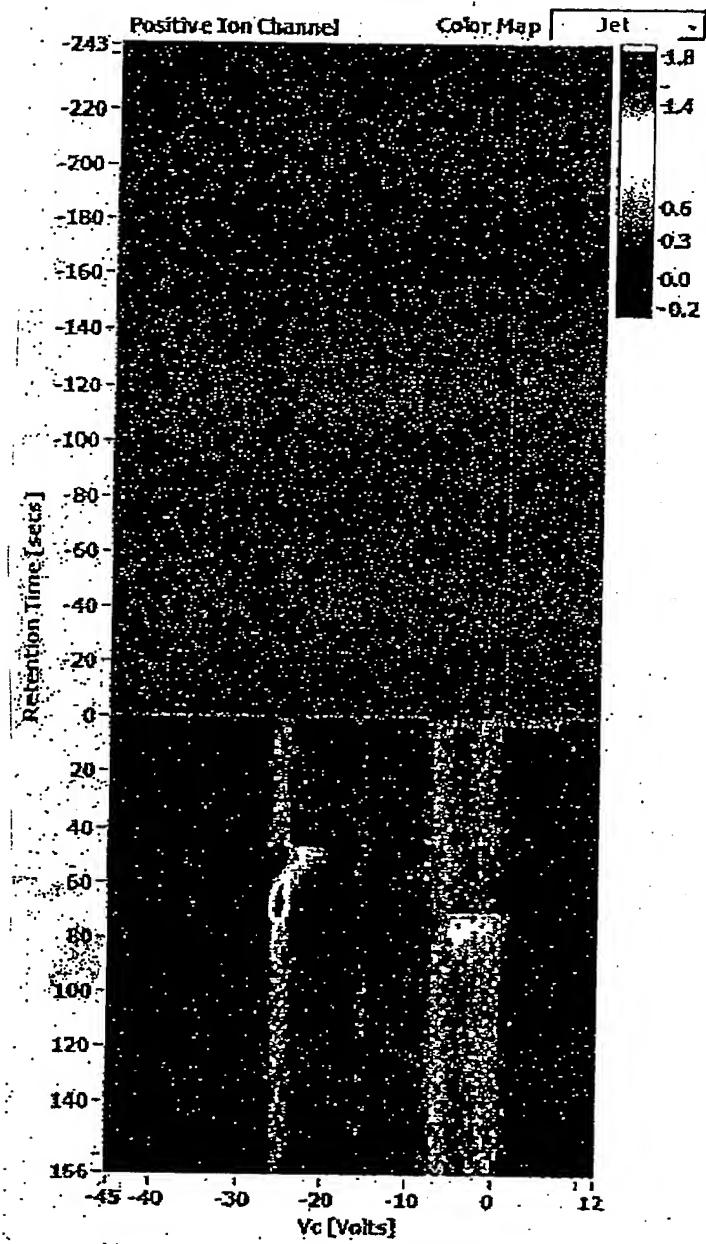


FIG. 11a

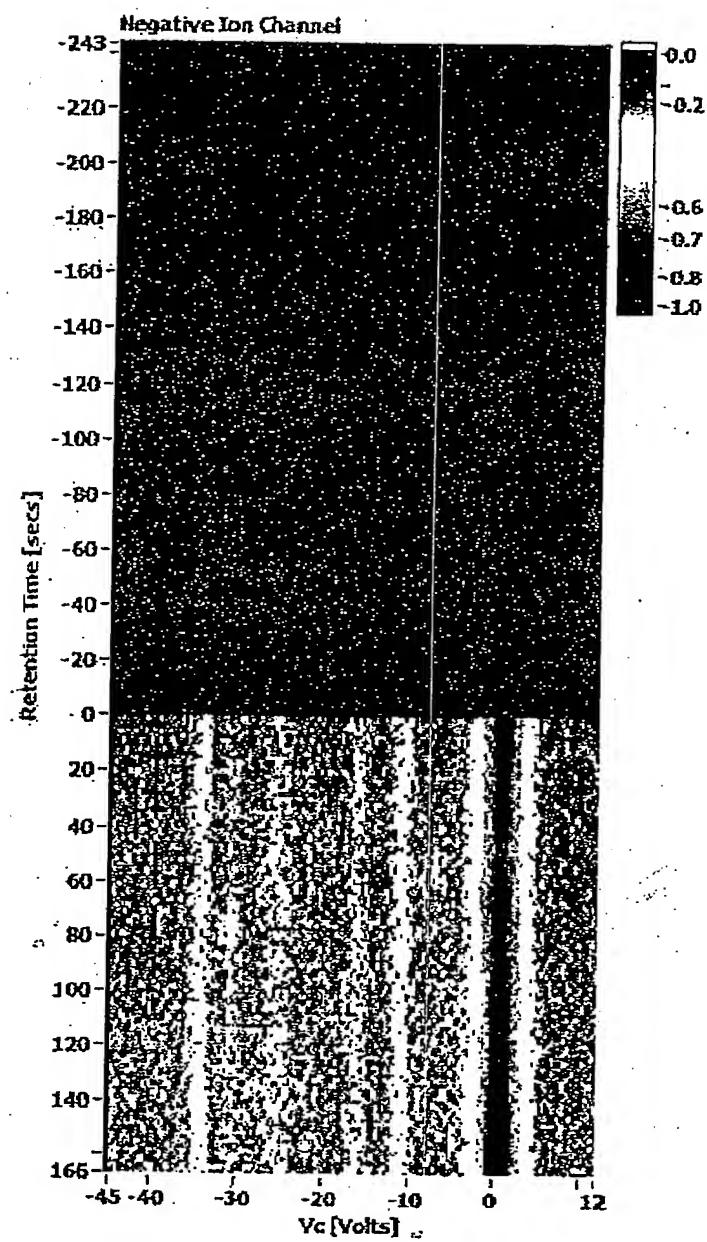


FIG. 11b

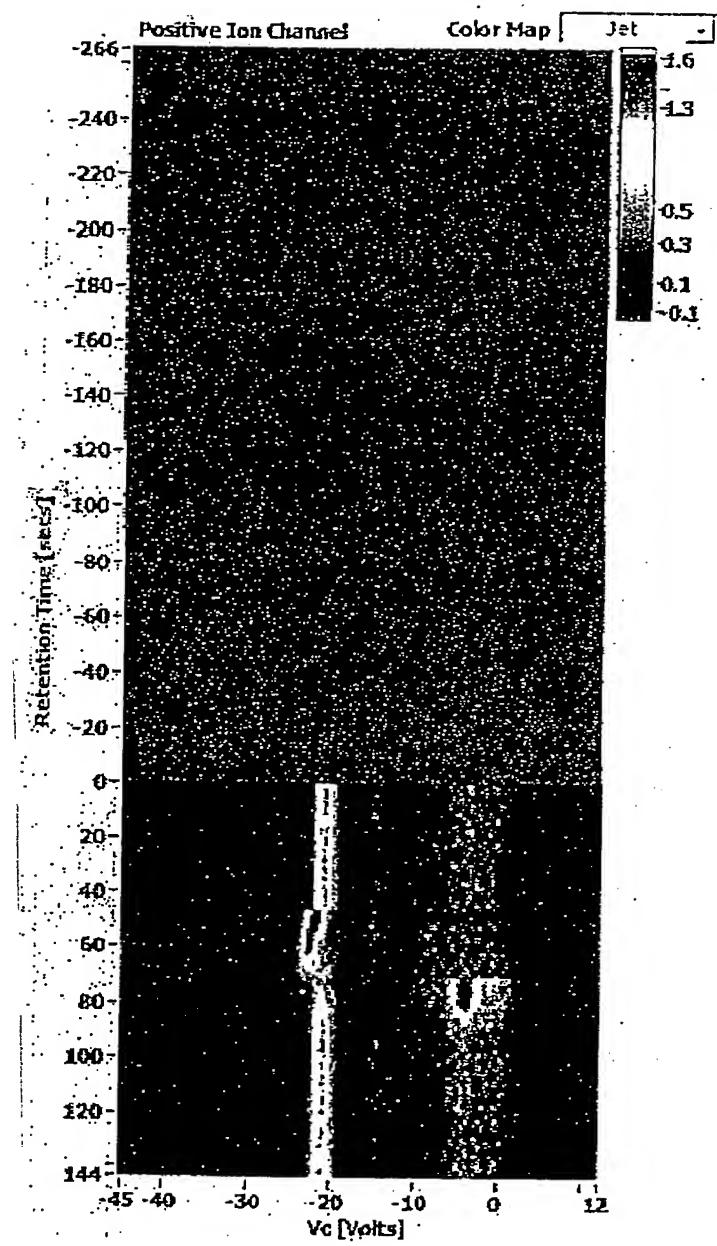


FIG. 12a

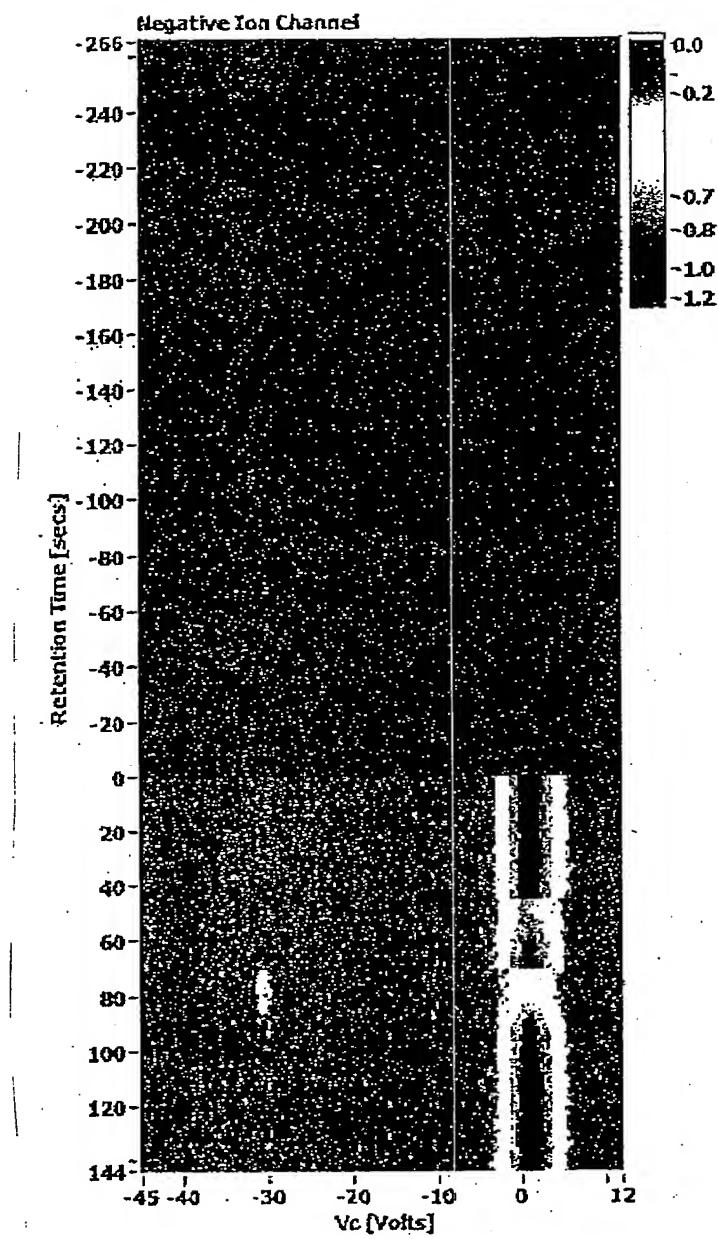


FIG. 12b

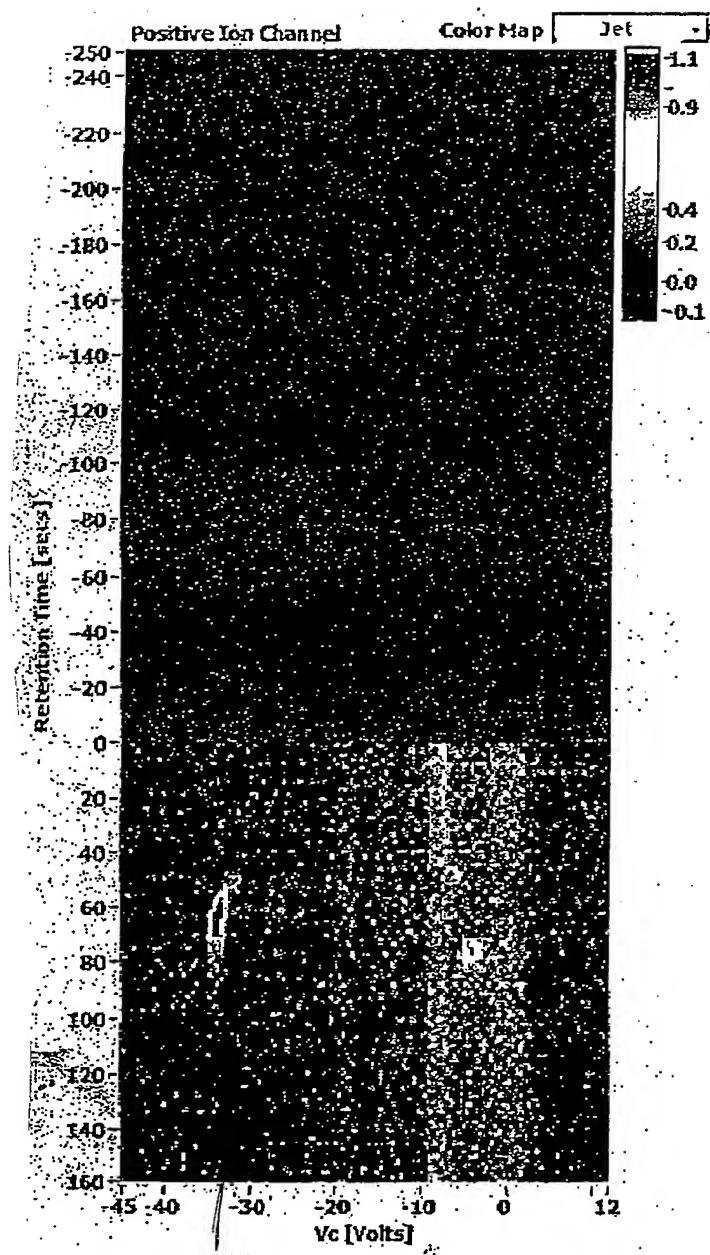


FIG. 13a

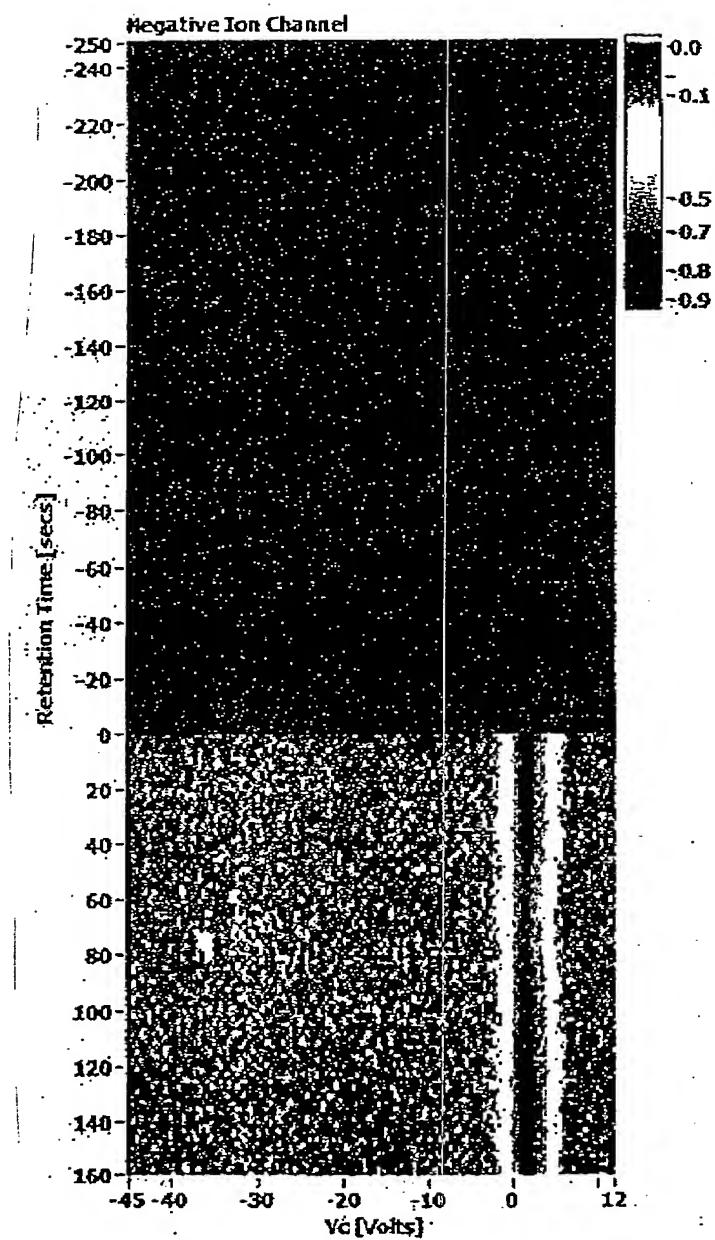


FIG. 13b

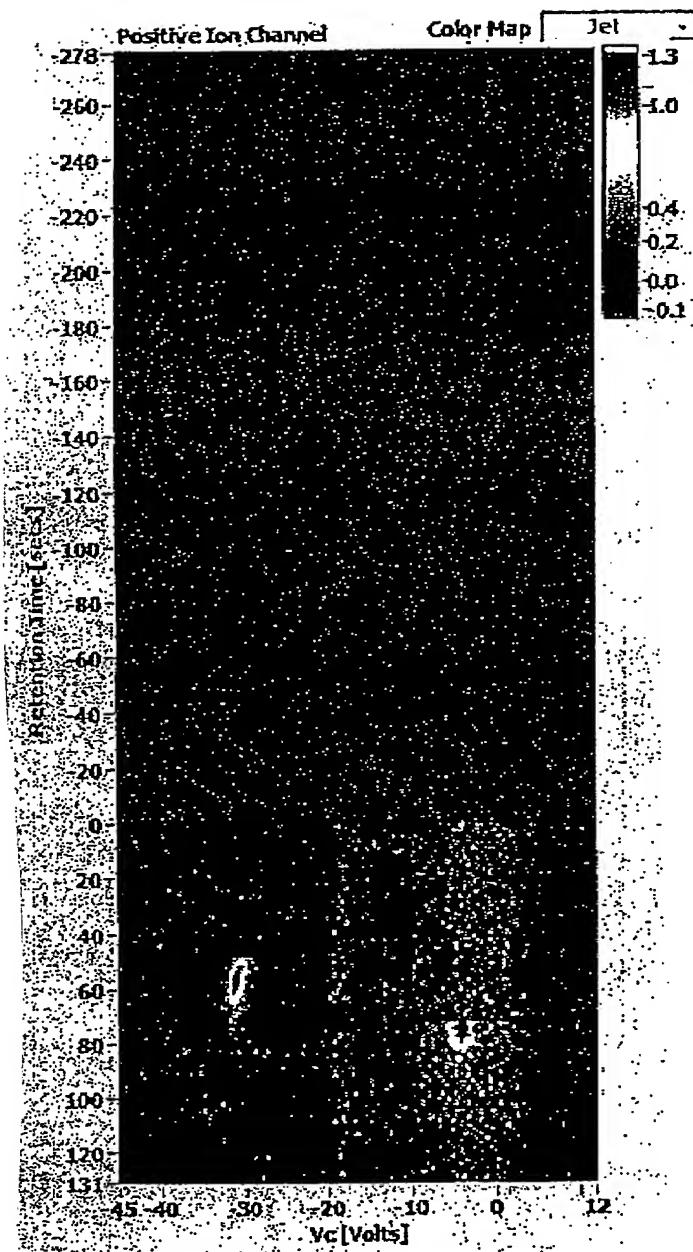


FIG. 14a

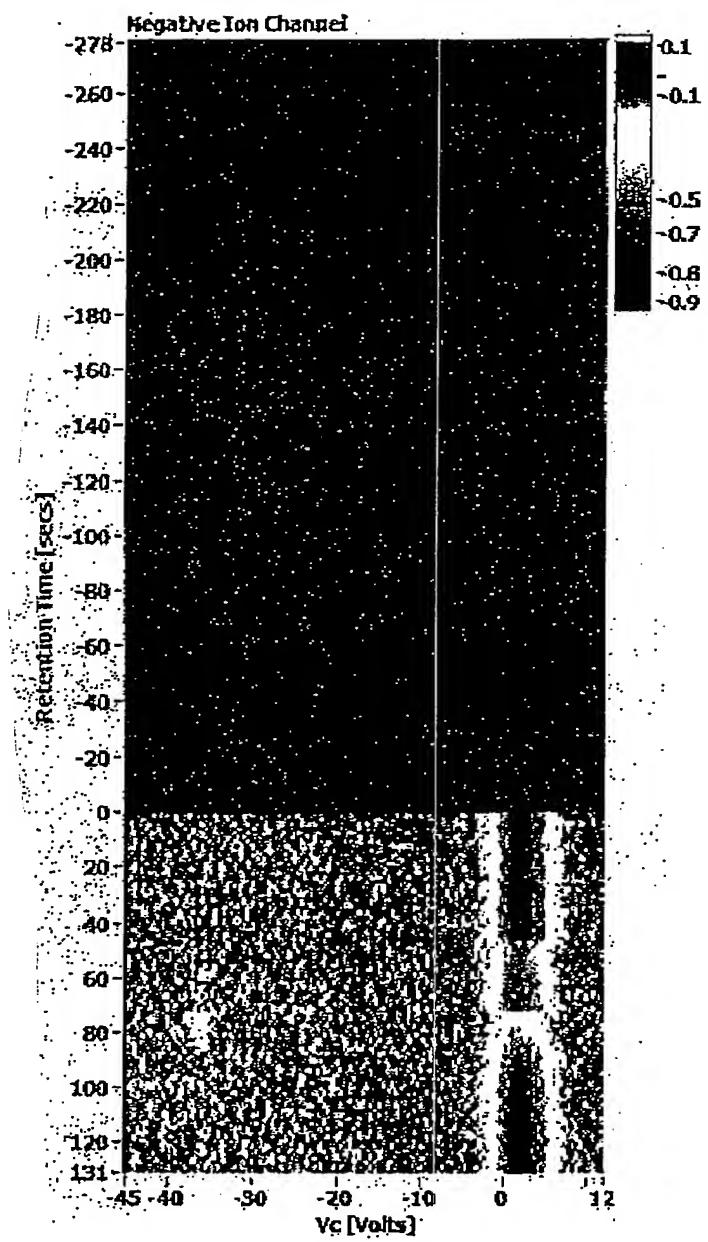


FIG. 14b